EBDHS-KNX

Ceiling PIR HS presence detector – KNX

Overview

The EBDHS-KNX PIR (passive infrared) presence detector provides automatic control of lighting loads with optional manual control. The EBDHS-KNX is a high sensitivity PIR detector suitable for high bay applications, such as warehouses and factories, and where high detection sensitivity is needed. The device is designed to be part of a KNX system.

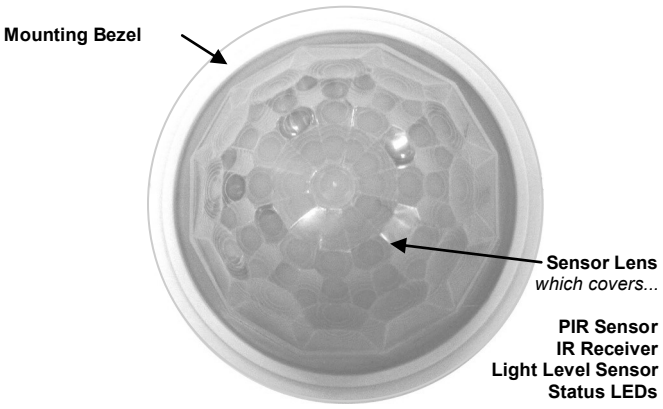
Features include.

- Two switch inputs to manually override the dimming levels and / or override the lights on or off.
- KNX programming mode accessible with IR handset and also by using the push switch on the back of the unit.
- Programmable logic block. This allows conditions to be set. For example: send the occupancy telegram only if the switch is pressed and the lux is low.
- Full scene selection functionality selectable via the IR handset (UHS7), eg: scene, on, off, raise and lower .

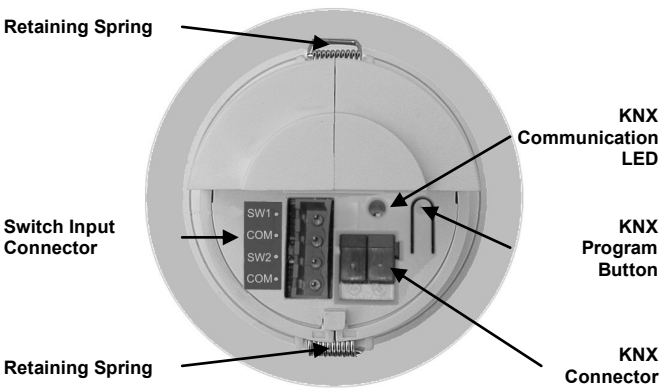
All functionality is fully programmable using the KNX ETS commissioning software.

Features

Front features



Back features



PIR Sensor
Detects movement within the unit's detection range, allowing load control in response to changes in occupancy.

IR Receiver
Receives control and programming commands from an IR (infrared) handset.

Light Level Sensor
Measures the overall light level in the detection area

Status LEDs
The LED flashes **R**ed to indicate the following:

Walk Test LED active	*when movement is detected*
Valid IR setting received	

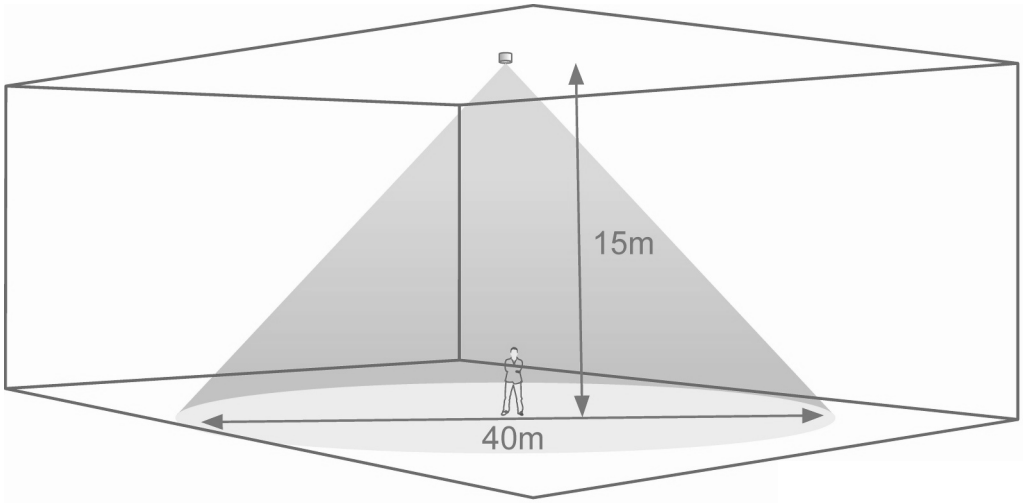
KNX Programming LED
The LED lights when the device is placed in programming mode via the button or IR remote. In programming mode, the Status LED will mimic the programming LED (i.e. will be on for the duration of programming mode).

KNX Programming Mode Button
Press to signal to the KNX network to enable the system to discover the device. This can also be done via the IR handset.

Switch Input Connector
Two inputs can be used to perform several configurable functions, for example, dim up / down, scene recall and also contribute to logic functions.

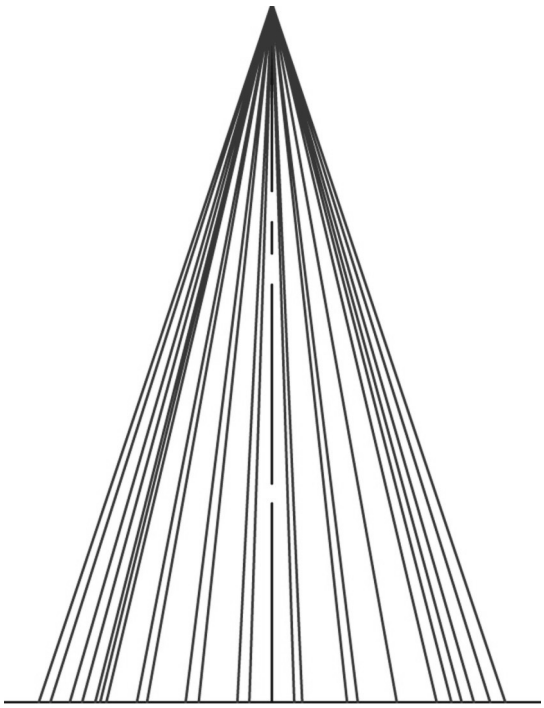
Detection diagrams

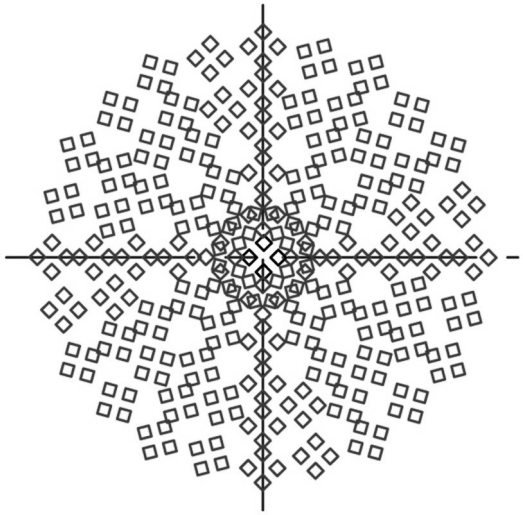
Range



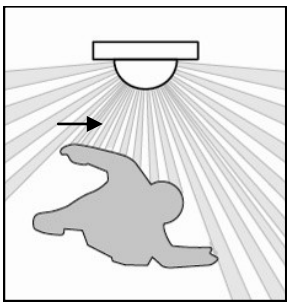
Maximum mounting height 20m

Detection pattern



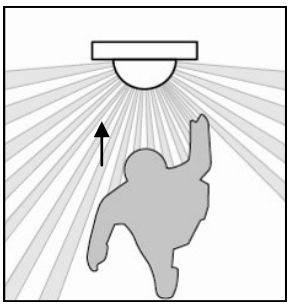


Walk across



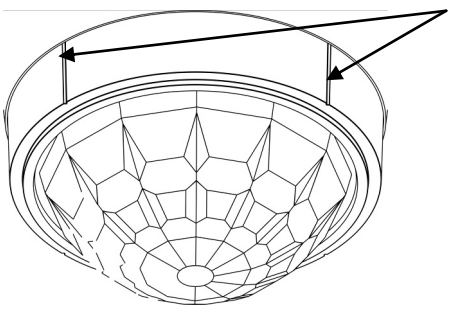
Height	Range Diameter
15m	40m
10m	26m
6m	16m
3m	9m

Walk towards



Height	Range Diameter
15m	30m
10m	20m
6m	12m
3m	8m

Alignment marks



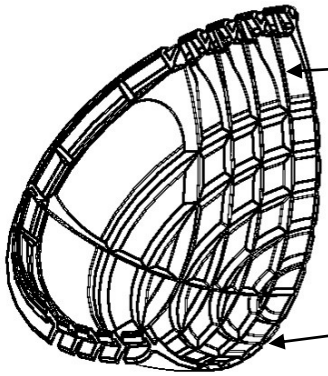
The sensor head has 4 alignment marks. These correspond to the 4 outer passive infrared sensors under the lens. Use these marks to align with aisles and corridors to ensure the best detection characteristics. See example overleaf.

Applications

Masking

The EBDHS-KNX includes two clip-on masking shields to allow for precise masking of the detection shape.

The masks can be easily shaped to produce detection patterns suitable for applications such as aisles and corners and for narrowing the detection diameter.

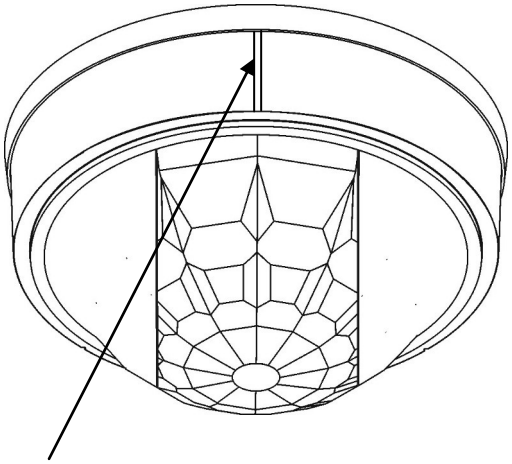


Lateral tear pattern for making a 'slot' style detection shape

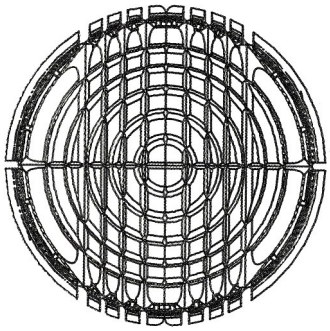
Radial tear pattern for narrowing the detection diameter

Aisles

Masking shields trimmed for aisle shaped detection



Align trimmed shields with sensor head alignment marks and aisle.



Slot number 1 2 3 4 4 3 2 1

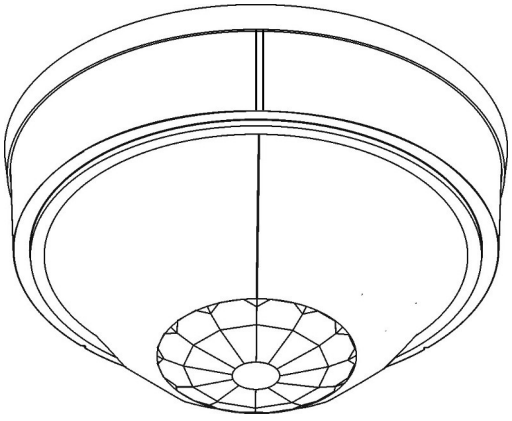
Slot number	Masking shield % coverage
1	45%
2	32%
3	22%
4	11%

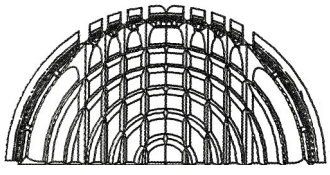
Example

Mounting height	6m
Trimmed to slots	2
Aisle detection width	16m x 32% = 5.1m walk across 12m x 32% = 3.8m walk towards

Narrow detection

Masking shields trimmed for a narrow beam of detection





Diameter number 1 2 3 4 5 5 4 3 2 1

Diameter number	Masking shield % coverage
1	89%
2	63%
3	45%
4	32%
5	22%

Example

Mounting height	15m
Trimmed to diameter	3
Detection diameter	40m x 45% = 18m walk across 30m x 45% = 13.5m walk towards

Installation

Choosing a Suitable Location

The EBDHS-KNX is designed to be ceiling mounted and must satisfy the following criteria:

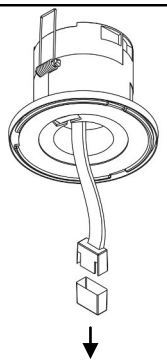
- Avoid positioning the unit where direct sunlight may enter the sensor element.
- Do not site the sensor within 1m of any lighting, forced air heating or ventilation.
- Do not fix the sensor to an unstable or vibrating surface.

Assembly

The EBDHS-KNX may be supplied in two parts. Follow the instructions to

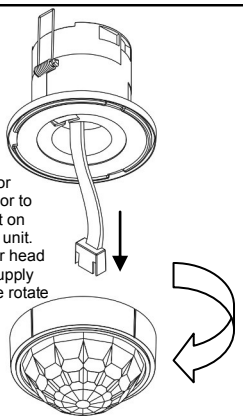
Safety note
Only apply power when the sensor head has been locked into position onto power supply.

1



Remove connector cover

2



Push-in sensor head connector to mating socket on power supply unit. Locate sensor head onto power supply and clockwise rotate until locked.

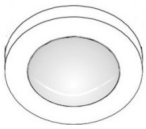
The EBDHS-KNX is designed to be mounted using either:

- Flush fixing, or
- Surface fixing, using the optional Surface Mounting Box (part no. DBB).

Both methods are illustrated below.
Use the supplied gasket to ensure IP rating *(not compatible with Surface Mounting Box part no. DBB).*

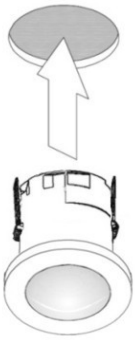
Flush Fixing

Warning - be careful bending springs when mounting unit.



1

Hole Ø64mm



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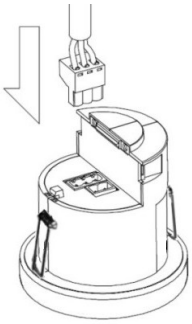
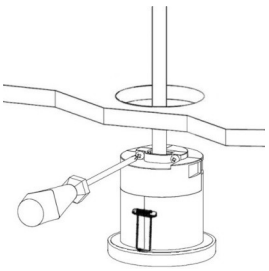


3



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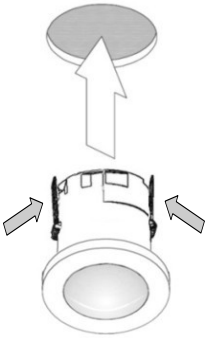
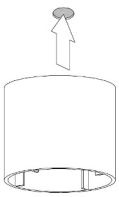


Surface Fixing

1

50mm or 60mm fixing centres



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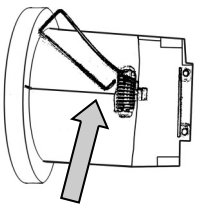
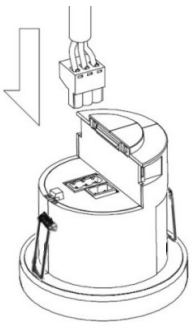


Pull out spring tab and rotate spring arm as shown

3



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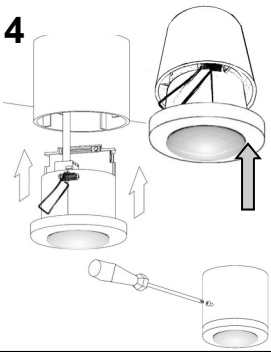
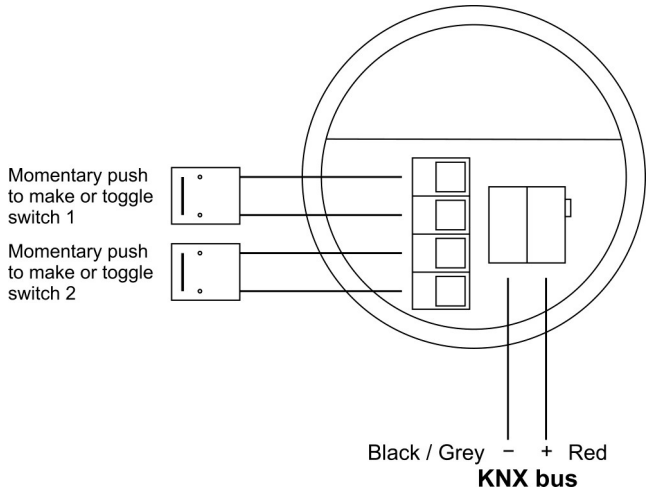


Wiring diagram

Switch inputs
Note: low voltage only



Fault finding

Device will not enter programming mode

- Check the KNX connections and that the bus segment is powered. The bus voltage should be approximately 30V.
- Check that the programming LED illuminates when the button is pressed on the rear of the unit.

What if the lighting does not turn ON?

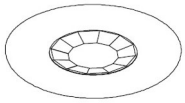
- Check that the unit has been correctly added to the KNX system.
- Check that the sensitivity has been correctly set via ETS.
- Check any logic functions carefully for intended operation.
- If using the constant brightness controller, check that the light level measured by the sensor is lower than the required threshold.
- If the detection range is smaller than expected, check the diagram on page 2. Rotating the sensor slightly may improve the detection range.

HINT: *The Walk Test LED function can be used to check that the unit is detecting movement in the required area.*

What if the lighting does not turn OFF?

- Check any logic functions carefully for intended operation.
- If using the constant brightness controller, check that the light level measured by the sensor is lower than the required threshold.
- Ensure that the area is left unoccupied for longer than the Time Out Period.
- Ensure that the sensor is not adjacent to circulating air, heaters or lamps.

IR operation



- **UHS5** Programming IR Handset. See below for programmable functions.
- **UHS7** User IR Handset. This handset can be used for selecting scenes, on, off, raise and lower. See user guide for full programming details.

For most basic programming operations the UHS5 handset can be used and the following procedures are based on using this device.
Point the handset at the Sensor and send the required programming commands to the unit as shown below.
Valid commands will be indicated by a red LED flash. See page 1 for details of other LED responses.
Note: other functions on the UHS5 which are not shown below are not applicable to this product.

		Number of Shift key presses					
Parameter Name	**Default Value**	**0** SHIFT 1 ○ SHIFT 2 ○	**1** SHIFT 1 ☼ SHIFT 2 ○	**2** SHIFT 1 ○ SHIFT 2 ☼	**3** SHIFT 1 ☼ SHIFT 2 ☼	**UHS5 Handset Graphics**	**Description**
		Button Activation					
On / Raise		On	Raise			ON/RAISE	Turn lights on or to raise lights.
Off / Lower		Off	Lower			OFF/LOWER	Turn lights off or to lower lights.
Walk test	Off	On	Off			OFF ON WALK TEST	When set to On this causes a red LED to flash on the sensor when it detects movement. Use this feature to check for adequate sensitivity levels. *Note. Will be cancelled by ETS or a power cycle.*
KNX Programming Mode		Selects mode	De-selects mode			B A PRESET PRS	Press to signal to the KNX network to enable the system to discover the device. *Note. The programming mode is cancelled automatically when ETS finishes programming the device.*

KNX function and configuration

Introduction

A presence detector monitors the detection zone for occupancy, and causes one or more actions to be executed when a person enters the detection area. In their simplest form, presence detectors could be used to turn on a light when a person enters a room, and to turn it off again after the person leaves.

This range of presence detectors use the same basic infra-red or microwave detection technology, but make use of the KNX system to communicate with other devices. The KNX standard defines how devices should communicate with each other, allowing systems to be constructed using components from many different manufacturers. The standard also guarantees that a presence detector from one manufacturer will effectively control a lighting dimmer or HVAC system from another.

Central to the KNX system is the ETS configuration tool. This Windows application allows an installer to configure all functions of each individual device in the system, and also how triggers and data are passed between different devices. For instance, the tool can be used to set the sensitivity of the presence detector, and can be associated with a particular lighting on-off channel. When someone walks into the room, the light will be turned on, and turned off after a configurable delay. The tool maintains a configuration database for the entire system, and downloads this configuration to each system element.

Functional Description

The presence detector consists of a infra-red detector element, reflected light sensor and two volt-free switch inputs. The KNX application has been designed to offer the installer a variety of useful functions such as movement detection, constant brightness control, user timers, lighting scene recall via infra-red handset and simple transmission of input states. Three ETS-configurable logic controllers allow the installer to fine-tune the behaviour of the detector in response to sensor state, switch inputs and KNX group objects offering a level of control that would normally require an external logic block.

The various functions are grouped in ETS as follows:

- **General settings**
  Basic settings such as walk test LED enable/disable, sensor sensitivity, movement timeout and light sensor calibration.
- **Switch inputs**
  Defines the behaviour when each of the switch inputs change state, e.g. dimming, switching or scene recall. Switch inputs may also be used as inputs to the three logic controllers.
- **Infra-red scene control**
  Defines which KNX scenes are mapped to the scene recall button on the UHS7 remote control, and how the on/ off buttons should behave.
- **Logic controller 1/2 (switch/scene)**
  Defines a custom logic function using simple drop-down boxes to send either switch or scene recall telegrams in response to the state of various inputs, sensor state and KNX group objects.
- **Logic controller 3 (brightness)**
  Defines a custom logic function using simple drop-down boxes to determine a brightness target value that should be maintained. The logic function may use various inputs, sensor state and KNX group objects to determine which brightness target should be active.
- **User timer 1/2**
  Each timer can be configured with up to two logic functions: one to start the timer, and one to stop it. The timer period can be independently set, and commands can be sent when the timer starts, is stopped or when the time period expires.
- **Basic movement detection**
  Raw switch output from the movement detector, suitable for signalling security systems or master sensors when used in master-slave mode.

For larger rooms, several Presence Detectors can be used to increase the coverage area. In this configuration, one presence detector acts as the master, and all other detectors act as slaves. When movement is detected by any of the slave detectors, a telegram is sent to the master via the KNX bus. The master detector uses this information as part of a logic expression to send dimming, scene recall or brightness commands to the controlled device. The movement timeout period is defined on the master device; slave devices simply need to send a telegram whenever movement is sensed.

Configuration

Configuration of the presence detector and associated logic functions is via the ETS tool, available from the KNX association. Start the process by downloading the device catalogue from www.cpelectronics.co.uk and importing it into ETS. Once imported, the device can be added to a project and assigned an individual address in the normal way.

The detector is configured via the Parameters tab, and all options are grouped by function as previously described. Group objects will be automatically enabled and disabled based on the chosen parameters.

Once the relevant parameters have been configured, group addresses may be assigned to detector functions, allowing the detector to communicate with other devices on the KNX bus. Finally, a download function is performed to write the settings and configuration to the detector.

The detector may be placed into programming mode using the programming pushbutton on the rear of the unit, or by using the optional UHS5 infra-red remote control. When the device enters programming mode, a red LED is illuminated on the rear of the unit, and also through the sensor aperture. Once programmed, the device will leave programming mode automatically.

General settings

The general configuration tab contains settings which relate to general operation of the detector, such as sensitivity, timeouts and whether the walk test LED should be enabled or disabled. Settings made in this section will also affect inputs to the various controllers detailed below, with the exception of the basic movement detection controller.

The detector contains a light sensor for use as part of the constant brightness controller, and to send light level readings to other devices on the KNX bus. It is important to note that the light sensor requires calibration in order to produce real lux values, and this calibration should take place once installed using a light meter.

To perform a calibration, the light level multiplier should initially be set to 1.0. The room should be furnished as reflected light (e.g. from uncovered floor tiles) will dramatically change the measured value. Using the ETS group monitor, record several lux values for different levels of illumination, with the light meter placed normally within the room. It will be necessary to assign a group address to the light level output group object.

Once these values have been recorded, the multiplier can be calculated as follows:

$$\textit{Multiplier} = \frac{\textit{lightmetervalue}}{\textit{detectorvalue}}$$

For example.

Light meter value	Detector value	Calculated Multiplier
590	534	1.105
928	816	1.137

An average of the calculated multiplier values yields a multiplier of 1.121.

General settings

Setting	Options	Description
Sensor walk test LED	Disable Enable	Enable or disable the sensor walk test LED, triggered when movement is detected. This is useful for commissioning, (or if the detector is to be used in bedrooms). Note that the walk test function can also be turned on and off via infra-red remote control.
Sensor sensitivity	0 to 9	Increase or decrease the detector's sensitivity to movement. 0 is least sensitive, 9 is most sensitive. The sensitivity can be overridden via infra-red remote, but will be overwritten when parameters are updated via ETS.
Lux multiplier	Floating point	Value to multiply raw light level readings by to obtain true lux value. In practice, this will need to be set with the aid of a light meter in the environment that the detector is used in, as reflected light and even choice of furnishings will dramatically affect the readings obtained.
Send light level telegrams every	0 – 65535s	Defines how often to send light level telegrams. It is only possible to send cyclically: immediate transmission would overload the bus.

Group Object	Data Type	Description
Light level output	9.4 DPT_Value_Lux	Simple cyclical output of current brightness in lux.

Switch inputs

The switch inputs parameters are used to define the behaviour when the two volt-free switch inputs are connected. The inputs can be used to send dimming commands, recall scenes or send simple switch (on/off) telegrams. It should be noted that these switch inputs can be used as part of logic functions if required.

Setting	Options	Description
Switch input 1 close action	Send 'dim up' command Send 'dim down' command Recall scene number Send 'on' command Send 'off' command Send 'on' command cyclically Send 'off' command cyclically Do nothing	Defines what type of command should be sent when switch input 1 is closed.
Switch input 1 close scene number	1 – 64	Scene number to recall when switch input 1 is closed
Switch input 1 open action	Send 'dim up' command Send 'dim down' command Recall scene number Send 'on' command Send 'off' command Send 'on' command cyclically Send 'off' command cyclically Do nothing	Defines what type of command should be sent when switch input 1 is opened.
Switch input 1 open scene number	1 – 64	Scene number to recall when switch input 1 is opened.
Switch input 1 touch action	Toggle on/off Toggle scene A/B Do nothing	Defines what command is sent when the button connected to the switch input is touched (i.e. pressed and released)
Switch input 1 scene number 'A'	1 - 64	Scene number to recall when scene 'A' is selected.
Switch input 1 scene number 'B'	1 - 64	Scene number to recall when scene 'B' is selected.
Switch input 1 hold action	Dim up/down Dim up Dim down Do nothing	Defines what command is sent when the button connected to the switch input is held. This may be specified in addition to the touch action above
Switch input 2 close action	Send 'dim up' command Send 'dim down' command Recall scene number Send 'on' command Send 'off' command Send 'on' command cyclically Send 'off' command cyclically Do nothing	Defines what type of command should be sent when switch input 2 is closed.

Switch inputs (continued)

Setting	Options	Description
Switch input 2 close scene number	1 – 64	Scene number to recall when switch input 2 is closed.
Switch input 2 close action	Send 'dim up' command Send 'dim down' command Recall scene number Send 'on' command Send 'off' command Send 'on' command cyclically Send 'off' command cyclically Do nothing	Defines what type of command should be sent when switch input 2 is closed.
Switch input 2 close scene number	1 – 64	Scene number to recall when switch input 2 is closed.
Switch input 2 open action	Send 'dim up' command Send 'dim down' command Recall scene number Send 'on' command Send 'off' command Send 'on' command cyclically Send 'off' command cyclically Do nothing	Defines what type of command should be sent when switch input 2 is opened.
Switch input 2 open scene number	1 – 64	Scene number to recall when switch input 2 is opened.
Switch input 2 touch action	Toggle on/off Toggle scene A/B Do nothing	Defines what command is sent when the button connected to the switch input is touched (i.e. pressed and released)
Switch input 2 scene number 'A'	1 - 64	Scene number to recall when scene 'A' is selected.
Switch input 2 scene number 'B'	1 - 64	Scene number to recall when scene 'B' is selected.
Switch input 2 hold action	Dim up/down Dim up Dim down Do nothing	Defines what command is sent when the button connected to the switch input is held. This may be specified in addition to the touch action above
Dim up/dim down step percentage	100% 50% 25% 12.5% 6.25% 3.125% 1.5625%	The percentage to add or subtract from the current dimmer value when the relevant button is pressed. Smaller percentages offer finer-grained control, but require the user to press the button more times to change the light level.
Send switch 1 cyclical telegrams every	0 – 65535s	Defines how often to send switch state telegrams if cyclical sending has been chosen.
Send switch 2 cyclical telegrams every	0 – 65535s	Defines how often to send switch state telegrams if cyclical sending has been chosen.

Group Object	Data Type	Description
Switch 1 scene recall	17.1 DPT_SceneNumber	Scene number transmitted when switch 1 changes state if in scene recall mode.
Switch 2 scene recall	17.1 DPT_SceneNumber	Scene number transmitted when switch 2 changes state if in scene recall mode.
Switch 1 state output	1.1 DPT_Switch	On/off switch state telegram if configured.
Switch 2 state output	1.1 DPT_Switch	On/off switch state telegram if configured.
Switch 1 dimming control output'	3.7 DPT_Control_Dimming	Dimming control output if switches are configured for dim up/dim down operation.
Switch 2 dimming control output'	3.7 DPT_Control_Dimming	Dimming control output if switches are configured for dim up/dim down operation.

Infra-red scene control

The infra-red scene control parameters are used to configure the scene recall behaviour when the sensor is used with the UHS7 remote control handset. This handset provides eight scene recall buttons, dim up/down buttons and on/off buttons. As KNX defines a maximum of 64 scenes per group object, the parameter page allows these scenes to be mapped to the 8 remote control buttons.

In addition, the on/off buttons may be used to transmit a simple switch telegram, or alternatively used to recall an additional two scenes. This would allow the 'off' scene to preserve a low level of light at all times.

Dim up/dim down buttons are provided for direct control of the dimmer; the dimming interval may also be set. Note that variations to brightness using this method will not be 'saved' by the dimmer; subsequent scene recalls will revert to programmed values.

Setting	Options	Description
On/off button command type	Switch Scene Recall	Defines whether the on/off buttons should be used to send switch or scene recall telegrams
Map 'on' button to scene	1 – 64	Scene number to be associated with 'on' button
Map 'off' button to scene	1 – 64	Scene number to be associated with 'off' button
Map button 1 to scene	1 – 64	Scene number to be associated with IR button 1
Map button 2 to scene	1 – 64	Scene number to be associated with IR button 2
Map button 3 to scene	1 – 64	Scene number to be associated with IR button 3
Map button 4 to scene	1 – 64	Scene number to be associated with IR button 4
Map button 5 to scene	1 – 64	Scene number to be associated with IR button 5
Map button 6 to scene	1 – 64	Scene number to be associated with IR button 6
Map button 7 to scene	1 – 64	Scene number to be associated with IR button 7
Map button 8 to scene	1 – 64	Scene number to be associated with IR button 8
Dim up/dim down step percentage	100% 50% 25% 12.5% 6.25% 3.125% 1.5625%	The percentage to add or subtract from the current dimmer value. Smaller percentages offer finer-grained control, but require the user to press the button more times to change the light level

Group Object	Data Type	Description
Scene recall output	17.1 DPT_SceneNumber	Scene number transmitted when IR scene button is pressed, or on/off buttons in scene recall mode.
Switch output	1.1 DPT_Switch	Switch on/off telegram transmitted when IR on/off buttons are pressed.
Dimming control output	3.7 DPT_Control_Dimming	Dimming telegram transmitted when IR dim up/dim down buttons are pressed. The increment can be configured by the installer.

Logic controller 1 / 2 (switch/scene)

The switch/scene logic controller tabs allow up to two independent switch/scene recall channels to be configured. Each channel receives the same inputs from the movement sensor and Switch input connections, but have separate KNX group objects. The behaviour of the channel is defined by a logic expression which ultimately evaluates to true or false, triggering one of two actions.

Configuring the logic expression is no more complicated than writing a sentence. Drop-down boxes allow various conditions, terms and actions to be chosen. If appropriate, additional drop-down boxes will appear to allow the expression to be expanded. The most basic configuration is as follows:

IF (Movement Detected) **THEN** Send 'On' Telegram **ELSE** Send 'Off' Telegram

This statement would cause the 'on' telegram to be sent to the corresponding channel's KNX output object when movement was detected, and then an 'off' telegram to be sent once the movement timeout has expired.

A more complicated example would use inputs to enable or disable the movement detector remotely, for instance:

IF (Movement Detected **AND** Group Enable Input Set) **OR** (Switch 1 Input Closed) **THEN** Send 'On' Telegram **ELSE** Send 'Off' Telegram

This statement would cause the 'on' telegram to be sent if movement had been detected and the detector has been remotely enabled, or if the local Switch 1 input was set. Otherwise the 'off' telegram would be sent. This example would be useful in a building in night mode where all detectors are normally switched off unless a local override switch has been operated.

The KNX slave input can be used as an input from another detector. When an 'on' telegram is received by this group object, the sensor considers the slave input to be set until the timeout period (in general settings) has expired. Any 'off' telegrams are ignored. This allows several slave detectors to be linked with a single master detector.

The controller can also be configured to send a scene recall telegram, for instance recalling a bright scene when movement is detected, and recalling a lower-light scene when the room is no longer occupied.

If required, telegrams can be sent cyclically (i.e. every few seconds), rather than only when the state changes. This may be required for some devices; the delay is configurable and should be chosen to avoid unduly loading the KNX bus.

Setting	Options	Description
Enable/disable logic controller 1/2	Disable Enable	Enable or disable this movement channel.
Logic conditions	Movement detected Movement cleared Group enable input set Group enable input clear Group slave input set Group slave input clear Switch 1 input closed Switch 1 input opened Switch 2 input closed Switch 2 input opened Brightness above lux threshold 'A' Brightness below lux threshold 'A' Brightness above lux threshold 'B' Brightness below lux threshold 'B'	Logic conditions may be combined using logic terms to form an expression, which is used to perform one action when the expression is true, and another when the expression is false.
Logic terms	AND OR THEN	Logic terms are used to define the function. The AND term indicates that ALL inputs must be true for the expression to be true, whereas the OR term will return true if one of the inputs is true. The THEN term is used to indicate that the expression is complete, and that the next item is an action.
Logic actions	Send 'on' telegram Send 'off' telegram Send 'on' telegram cyclically Send 'off' telegram cyclically Recall scene 'A' Recall scene 'B' Set brightness level 'A' Set brightness level 'B Send nothing	When the logic expression is evaluated, an action may be associated with both the if-then and else portions of the expression, i.e. Send 'on' telegram if the expression is true, else Send 'off' telegram.
Movement timeout source	ETS parameter or Group object	Movement timeout may be set statically using ETS, or alternatively may be changed by other devices on the KNX bus
Movement timeout	0 – 32767s, 0 - 546mins, 0 - 9hrs	How long to wait after the last movement is detected before signalling a 'movement cleared' state
Brightness threshold 'A'	Floating point	Lux value to be used as comparison value in logic function, e.g. above or below this value.
Brightness threshold 'B'	Floating point	Lux value to be used as comparison value in logic function, e.g. above or below this value.
Scene 'A'	1 - 64	KNX scene number to be recalled on command.
Scene 'B'	1 - 64	KNX scene number to be recalled on command..

Logic controller 1 / 2 (switch/scene) (continued)

Setting	Options	Description
Brightness setting 'A'	0 - 100%	The brightness percentage to send to the dimmer when required.
Brightness setting 'B'	0 - 100%	The brightness percentage to send to the dimmer when required.
Send cyclical telegrams every	0 – 65535s	How often to send cyclical telegrams if selected as part of the logic function.

Group Object	Data Type	Description
Logic controller 1 (motion) - Switch state output	1.1 DPT_Switch	The main output from the channel's logic expression.
Logic controller 1 (motion) - Scene recall output	17.1 DPT_SceneNumber	Configured scene number is sent via this group object if required.
Logic controller 1 (motion) - Enable input	1.3 DPT_Enable	Global enable/disable input for this channel allowing remote devices to participate in the logic function.
Logic controller 1 (motion) - Slave trigger input	1.1 DPT_Switch	Slave input for this channel, allowing the state of other detectors to be read as part of the logic function.
Logic controller 1 (motion) - Movement timeout input	7.5 DPT_TimePeriodSec	Allows a remote device to change the movement timeout, if this option is selected. The value must be in seconds.
Logic controller 1 (motion) - Absolute dimmer percentage	5.4 DPT_Percent_U8	Configured dimmer percentage is sent via this group object if required.
Logic controller 2 (motion) - Switch state output	1.1 DPT_Switch	The main output from the channel's logic expression.
Logic controller 2 (motion) - Scene recall output	17.1 DPT_SceneNumber	Configured scene number is sent via this group object if required.
Logic controller 2 (motion) - Enable input	1.3 DPT_Enable	Global enable/disable input for this channel allowing remote devices to participate in the logic function.
Logic controller 2 (motion) - Slave trigger input	1.1 DPT_Switch	Slave input for this channel, allowing the state of other detectors to be read as part of the logic function.
Logic controller 2 (motion) - Movement timeout input	7.5 DPT_TimePeriodSec	Allows a remote device to change the movement timeout, if this option is selected. The value must be in seconds.
Logic controller 2 (motion) - Absolute dimmer percentage	5.4 DPT_Percent_U8	Configured dimmer percentage is sent via this group object if required.

Logic controller 3 (brightness)

The brightness logic controller aims to maintain a uniform brightness in the sensor area at all times (known as daylight linking, daylight harvesting or maintained illuminance). Two brightness targets can be defined, subject to a successful calibration (as detailed earlier). In similar fashion to the movement controllers, a logic expression can be constructed to choose which brightness target the controller should try to achieve. This would allow the lights to be turned off overnight, or for the lights to be made brighter when the room is occupied.
The controller sends an 8-bit absolute percentage value to the dimmer. The installer may choose suitable values for the dimming increment and interval: these values should be chosen to minimise dimmer oscillation and response time. A deadband setting prevents the controller from making unnecessary adjustments. It is also possible to set a brightness target via a KNX group object, allowing the brightness target to be controlled from elsewhere. This might be useful in combination with a room reservations system, or to make the lights dimmer at weekends.
Dimming telegrams are sent when required by the controller; the controller will not send dimming telegrams when the measured light level is close to the target value, subject to the deadband setting.

Setting	Options	Description
Enable/disable logic controller 3	Disable Enable	Enable or disable the logic controller function.
Logic conditions	Movement detected Movement cleared Group enable input set Group enable input clear Group slave input set Group slave input clear Switch 1 input closed Switch 1 input opened Switch 2 input closed Switch 2 input opened	Logic conditions may be combined using logic terms to form an expression, which is used to perform one action when the expression is true, and another when the expression is false.
Logic terms	AND OR THEN	Logic terms are used to define the function. The AND term indicates that ALL inputs must be true for the expression to be true, whereas the OR term will return true if one of the inputs is true. The THEN term is used to indicate that the expression is complete, and that the next item is an action.
Logic actions	Set brightness target A Set brightness target B Set remote brightness target Set dimmer on Set dimmer off	When the logic expression is evaluated, an action may be associated with both the if-then and else portions of the expression, i.e. Set brightness target 1 if the expression is true, else Set brightness target 2.
Movement timeout source	ETS parameter or Group object	Movement timeout may be set statically using ETS, or alternatively may be changed by other devices on the KNX bus
Movement timeout	0 – 32767s, 0 - 546mins, 0 - 9hrs	How long to wait after the last movement is detected before signalling a 'movement cleared' state
Brightness target A	Floating point	Target value in lux for the brightness controller to aim for.
Brightness target B	Floating point	Target value in lux for the brightness controller to aim for.
Telegram interval	0 – 65535 milliseconds	How often to send commands to the dimmer when varying the brightness.
Dimming increment	100% 50% 25% 12.5% 6.25% 3.125% 1.5625%	The amount by which each subsequent dimming telegram raises or lowers the light level. Typically a small value will be used here, but will depend on the environment. Large values may cause the dimmer to oscillate between light and dark.
Dimming deadband	Floating point	Deadband value in lux within which the controller will not attempt to vary the light output.

Group Object	Data Type	Description
Percentage output	5.4 DPT_Percent_U8	Brightness control for connected dimmer. The constant brightness controller will increase or decrease this value depending on the target selected
Enable input	1.3 DPT_Enable	Global enable/disable input for this channel allowing remote devices to participate in the logic function.
Slave trigger input	1.1 DPT_Switch	Slave input for this channel, allowing the state of other detectors to be read as part of the logic function.
Movement timeout input	7.5 DPT_TimePeriodSec	Allows a remote device to change the movement timeout, if this option is selected. The value must be in seconds.
Target lux input	9.4 DPT_Value_Lux	Brightness target value set by an external device, rather than an internal preset
Target lux output	9.4 DPT_Value_Lux	Brightness target value selected by logic function, for use by other devices.

User timer 1/2

Two user-configurable timers may be used to send commands based on timed events. Each timer may be started and stopped using independent logic expressions, for instance starting a timer when movement is detected, and stopping it if a final exit switch is closed. Once started, a timer will run until it expires, or is stopped. If the 'start' condition is matched again (for instance, additional motion is detected), then the time period will be reset.

Commands may be attached to three timer events: timer start, timer stop and timeout. These commands may be used to switch a remote device on or off, set a scene or set a brightness level. It is possible to use both timers together to achieve a three-stage illumination profile.

Setting	Options	Description
Timer start logic expression	Movement detected Movement cleared Group enable input set Group enable input clear Group slave input set Group slave input clear Switch 1 input closed Switch 1 input opened Switch 2 input closed Switch 2 input opened Brightness above lux threshold 'A' Brightness below lux threshold 'A' Brightness above lux threshold 'B' Brightness below lux threshold 'B'	Logic conditions may be combined using logic terms to form an expression which, when true, starts (or restarts) the timer. There is no action when the expression evaluates to false.
Logic terms	AND OR THEN	Logic terms are used to define the function. The AND term indicates that ALL inputs must be true for the expression to be true, whereas the OR term will return true if one of the inputs is true. The THEN term is used to indicate that the expression is complete, and that the next item is an action.
Timer stop logic expression	Movement detected Movement cleared Group enable input set Group enable input clear Group slave input set Group slave input clear Switch 1 input closed Switch 1 input opened Switch 2 input closed Switch 2 input opened Brightness above lux threshold 'A' Brightness below lux threshold 'A' Brightness above lux threshold 'B' Brightness below lux threshold 'B'	Logic conditions may be combined using logic terms to form an expression which, when true, stops the timer. There is no action when the expression evaluates to false.
Logic terms	AND OR THEN	Logic terms are used to define the function. The AND term indicates that ALL inputs must be true for the expression to be true, whereas the OR term will return true if one of the inputs is true. The THEN term is used to indicate that the expression is complete, and that the next item is an action.
Movement timeout source	ETS parameter or Group object	Movement timeout may be set statically using ETS, or alternatively may be changed by other devices on the KNX bus
Movement timeout	0 – 32767s, 0 - 546mins, 0 - 9hrs	How long to wait after the last movement is detected before signalling a 'movement cleared' state
Brightness threshold ‘A’	Floating point	Lux value to be used as comparison value in logic function, e.g. above or below this value.
Brightness threshold ‘B’	Floating point	Lux value to be used as comparison value in logic function, e.g. above or below this value.
Timer duration	0 – 32767s, 0 - 546mins, 0 - 9hrs	How long the timer remains active. Once started, the timer will run for the duration, then signal a timeout. If the start condition is set again, then the timer will be re-started. If the timer is stopped, the timeout condition will not be reached.
Action on timer start	Send 'on' telegram Send 'off' telegram Set scene number Set dimmer value Do nothing	Defines the command to send when the timer event occurs. Only one command will be sent for each event - for instance, if a timer start event has been sent, the timer must be stopped or must time out before another start event will be triggered.
Scene #	1 - 64	KNX scene number to be recalled on command.
Brightness	0 - 100%	The brightness percentage to send to the dimmer when required.

User timer 1/2 (continued)

Setting	Options	Description
Action on timer stop	Send 'on' telegram Send 'off' telegram Set scene number Set dimmer value Do nothing	Defines the command to send when the timer event occurs. Only one command will be sent for each event - for instance, if a timer start event has been sent, the timer must be stopped or must time out before another start event will be triggered.
Scene #	1 - 64	KNX scene number to be recalled on command..
Brightness	0 - 100%	The brightness percentage to send to the dimmer when required.

Group Object	Data Type	Description
User timer 1 - Switch state output	1.1 DPT_Switch	On/off command sent from timer start, stop and timeout events if configured.
User timer 1 - Scene recall output	17.1 DPT_SceneNumber	Scene preset sent from timer start, stop and timeout events if configured.
User timer 1 - Absolute dimmer percentage	5.4 DPT_Percent_U8	Preset dimmer percentage sent from timer start, stop and timeout events if configured.
User timer 1 - Enable input	1.3 DPT_Enable	Global enable/disable input for this channel allowing remote devices to participate in the logic function.
User timer 1 - Slave trigger input	1.1 DPT_Switch	Slave input for this channel, allowing the state of other detectors to be read as part of the logic function.
User timer 1 - Movement timeout input	7.5 DPT_TimePeriodSec	Allows a remote device to change the movement timeout, if this option is selected. The value must be in seconds.
User timer 2 - Switch state output	1.1 DPT_Switch	On/off command sent from timer start, stop and timeout events if configured.
User timer 2 - Scene recall output	17.1 DPT_SceneNumber	Scene preset sent from timer start, stop and timeout events if configured.
User timer 2 - Absolute dimmer percentage	5.4 DPT_Percent_U8	Preset dimmer percentage sent from timer start, stop and timeout events if configured.
User timer 2 - Enable input	1.3 DPT_Enable	Global enable/disable input for this channel allowing remote devices to participate in the logic function.
User timer 2 - Slave trigger input	1.1 DPT_Switch	Slave input for this channel, allowing the state of other detectors to be read as part of the logic function.
User timer 2 - Movement timeout input	7.5 DPT_TimePeriodSec	Allows a remote device to change the movement timeout, if this option is selected. The value must be in seconds.

Basic movement detection

The basic movement detection parameters are designed to provide raw access to the movement sensor itself. Movement detection by this function is not affected by the movement timeout parameter in the General parameters settings section – i.e. an telegram indicating an absence of movement will be sent relatively quickly.

'For operation as a slave device in a multi-sensor environment, it is necessary to configure the sensor to send an 'on' command when movement is detected. There is no need to configure the corresponding 'off' command, as this timeout is handled by the master detector. The switch state group object should be linked with the corresponding slave input on the master detector.

Setting	Options	Description
When movement detected	Send 'on' command Send 'off' command Send 'on' command cyclically Send 'off' command cyclically Do nothing	Defines which switch telegram should be sent when movement is detected.
When movement cleared	Send 'on' command Send 'off' command Send 'on' command cyclically Send 'off' command cyclically Do nothing	Defines which switch telegram should be sent when movement is no longer detected.
Send cyclical telegrams every	0 – 65535s	Defines how often to send switch state telegrams if cyclical sending has been chosen.

Group Object	Data Type	Description
Movement state output	1.1 DPT_Switch	Switch state transmitted when movement is detected, or movement is no longer detected. Note that this is the raw sensor state - timeouts do not apply

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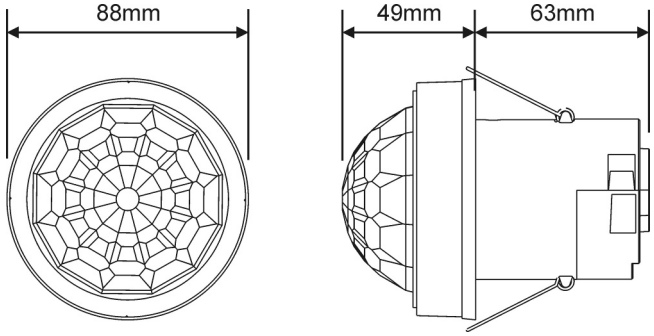
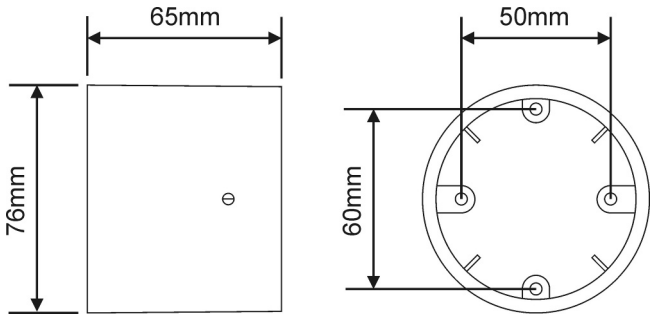
Technical data

Dimensions	See diagrams opposite	
Weight	0.20kg	
Supply Voltage	30V DC via KNX bus	
Current consumption	6.4mA	
Terminal Capacity	KNX	1.2mm^2 (22swg) via KNX connector
	Switch input	2.5mm^2
Temperature	-10ºC to 35ºC	
Humidity	5 to 95% non-condensing	
Material (casing)	Flame retardant ABS and PC/ABS	
Type	Class 2	
IP rating	40 without gasket. 65 with gasket.	
Compliance	EMC-2004/108/EC LVD-2006/95/EC	CE

EBDHS-KNX



DBB



UK and international patents applied for

Part numbers

	Part number	Description
Detector	EBDHS-KNX	Ceiling HS PIR presence detector – KNX
Accessories	DBB	Surface mounting box
	UHS5	Programming IR handset
	UHS7	User IR handset

IMPORTANT NOTICE!
This device should be installed by a qualified electrician in accordance with the latest edition of the IEE Wiring Regulations and any applicable Building Regulations.

bsi. ISO 9001 Quality Management FM 45789 ISO 14001 Environmental Management EMS 534520

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Due to our policy of continual product improvement CP Electronics reserves the right to alter the specification of this product without prior notice.

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